

High School Robotics Competition 2023

— A Very Short Story —

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March 19, 2023

When Roberto happened to watch this year's high school robotics competition on his computer, he noticed something. The landscape of the competition seemed a little different this year. He was able to tell because his son was in a high school robotics team several years ago. His impression was that while some traditionally strong teams are not doing so well, some of the newer, less experienced teams are scoring relatively high.

The most common type of high school robotics competition involves moving robots which manipulate objects to score. For the past few years, the objects were balls of various sizes and materials. This year, there are two types of objects. One is a sort of "cubical" beach ball, and the other is a traffic cone. Not surprisingly, many teams are trying to manipulate both types of objects, typically using robotic "fingers." The fingers are supposed to have various functions including grabbing, holding, moving, and releasing.

As Roberto watched the game, he realized that it is not an easy task to deal with both types of objects, especially considering that teams in general have to build a robot in about six weeks after the announcement of the year's game plan and rules. Considering the challenge, some teams opted to deal with only one type of object. And this may have been working out for them.

While watching the live stream, Roberto recalled the history of modern technologies: cars, airplanes, and phone. When humans tried to move faster than they can run, they did not emulate what fast animals do. That is, they did not invent a vehicle with four sticks that would work like "legs." Instead, and most obviously, they invented wheels. Initially, these vehicles were horse- or ox-driven, until steam engine was invented. It took several thousand years for this development to happen.

When humans tried to fly, they initially emulated birds and created wings of various shapes. Of course, this failed miserably and they eventually turned to fixed wings and took advantage of speed-induced lift. It took several hundred years before they became airborne.

When humans tried to communicate over a distance longer than the human voice can reach, they may have gotten ideas from elephant communication, relying on low-frequency sound waves. Surely, they used drums and also established a relay of drums. Eventually, they invented radios and used electromagnetic waves as the medium. Even after this, it took several decades until they were able to enjoy the benefit of modern mobile phones.

Watching this year's high school robotics competition, Roberto could not avoid thinking about past humans emulating animals for developing a new set of abilities. However, these high school robotics teams cannot afford to spend hundreds or thousands of years to refine their robots. They only have about six weeks.

Then, it might make more sense to extract a very small number of core elements and focus on enhancing them, just like modern technology emerged at an early stage. For example, for this year's robotics competition, certain newer teams build robots which can handle only traffic cones, entirely ignoring cubical beach balls. As a result, their mechanisms tend to be simpler than more general-purpose, "finger"-based robots and actually performed fairly well on achieving high scores. This makes sense, Roberto thought.

So, Roberto wanted to share his observation with his son, who is now working for a toy company. His company developed tiny flying toys which flap wings. Roberto asked his son whether his company is backward.

"Dad, we are *toy* manufacturers. We make 'fun' stuff, *not* 'functional' or 'realistic' devices. Regardless of your observation, it's just so fascinating that we can only recently emulate flying birds or bugs. It requires minuscule and high-tech components. It's a sort of modern revival of our old dreams."

"OK, OK. I got the idea. You have the point. Any way, isn't it amazing that animals can gain their own specialized abilities totally within their life time, without years and years of designing, engineering, or manufacturing?"

"But Dad, remember that my mom, *not you*, spent years and years of taking care of me until I got my own ability to navigate the world. I guess your mom did the same to you..."



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